Research on Vehicle Network Architecture and Key Technologies Based on Cloud Computing and Wsn

Quan Zikun[1,] Ning Gao [2] and Huang Yushan[3]

[1.3] Shandong University, Shandong,448000, China

2.Ningbo Institute of Technology, Zhejiang University, Zhejiang, 315100, China

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Abstract: The article first briefly introduces the architecture and application direction of the car networking system. Then, based on the actual situation, from the two aspects of cloud computing and wsn, the discussion on the establishment of the Internet of Vehicles includes collecting, processing and applying traffic data. Etc., I hope to be able to help the technical staff, so that the positive role of cloud computing and wsn can be fully exerted in the car networking system, thus promoting the progress of China's transportation industry.

Foreword

The development of the economy has intensified the situation of traffic congestion. The road construction has been unable to meet the speed of automobile growth. To solve the problem of traffic congestion, the key is to effectively deploy and manage vehicles. For example, take the vehicle as the core and establish The corresponding information system utilizes the advantages of the Internet to improve the efficiency of extracting and utilizing vehicle information, supervising the running state of the vehicle in various aspects, and providing corresponding services according to the actual needs of the vehicle.

1. Car Networking System Architecture

Research shows that the Internet of Vehicles provides the impetus for the development of comprehensive, intelligent and safe urban transportation systems. The data, functions and technologies that constitute the Internet of Vehicles system have strong demands on communication, and acquire and process data. The methods are also different, based on the products and service functions developed by the Internet of Vehicles, thus showing a phased feature.Only by establishing a unified architecture and determining the relationship and function of subsystems according to the characteristics of the Internet of Vehicles can we solve the problem of disorderly traffic flow and make the Internet of Vehicles have the economic, efficiency and flexibility it deserves.Practice has proved that the car network architecture that can fully play its role is mainly divided into three parts, namely, traffic cloud platform, intelligent vehicle system and intelligent roadbed system.

With the cloud computing and wsn relying on the established vehicle networking system, it has injected a strong shot into the transformation of the transportation industry, using the Internet of Vehicles to coordinate the allocation of road resources, changing the original traffic organization and grooming mode, on this basis, The corresponding traffic data platform can improve the intelligent level of traffic management work invisibly. It can be seen that the vehicle network has broad development prospects in the transportation industry, and the specific application directions include traffic coordination control, traffic warning and law enforcement, and no parking. Charge, allocate transportation resources and induce traffic, etc.[1].

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2. Key Technologies of the Car Networking System

2.1. Wsn technology

Wsn is an important part of the Internet of Vehicles, including task management nodes, sensor nodes, receiving transmitters, etc. These nodes together constitute a wireless sensor network. Research shows that wsn has low power consumption, network self-organization and real-time characteristics. Of course, the shortcomings of this technology are also very obvious, for example, the communication range is small, the storage and computing functions are weak, etc. In order to effectively apply wsn in the Internet of Vehicles, the technical personnel should focus on the following:

2.1.1. Collecting traffic data

The real-time and efficient collection of traffic data is regarded as the basis of the Internet of Vehicles, the support of providing services and the processing object of cloud computing technology. The use of wsn nodes to collect traffic data often requires the application of two technologies: Precise positioning of road network vehicles. The traditional vehicle positioning method takes gps as the core, transmits the vehicle position and specific vehicle speed to the data center, and qualitatively reflects the road network condition, and the existence of multipath effect will bring the quality of gps signal. Certainly, the positioning accuracy will decrease. If the vehicle position cannot be determined, the value of the data transmitted to the data center will be difficult to achieve. The emergence of environmental sensing technology with radar, laser, wsn, gnss and image data as the core makes the above The problem has been effectively solved. With the application of high-precision subway and track estimation technology, the accuracy of vehicle positioning can be mentioned to the highest; secondly, multi-channel traffic data is collected. The main task of the Internet of Vehicles is for dynamic traffic data. Real-time and efficient acquisition of traffic flow data, such as travel time, traffic flow and vehicle positioning, etc., sensor nodes are used to assist theThe development of the work, specifically, the application of positioning acquisition, microwave detection, video detection and infrared detection technology, to complete the work of obtaining traffic data. Practice has proved that the advantages and disadvantages of the above technologies are very obvious, only the integration of multiple technologies In order to improve the accuracy of traffic data collection, in addition, the technician should note that the structure of the wsn node does not depend on only one sensor, but needs to be applied to multiple sensors and application modules. Therefore, how to effectively connect Sensors and integration of application modules should be considered the main direction of work.

2.1.2 .Information Fusion and Topology

On the one hand, node information fusion. The traffic data collected by the wsn node is complex and huge, and each node has limited ability to store data. To reduce the number of nodes transmitting data in the communication process, the key is to integrate the collected traffic data. Ensure that the node only stores the necessary data. At this stage, the method can be used to fuse data, mainly the neural network method and the Bayesian method. To make the above-mentioned fusion method fully play, the key is to integrate according to traffic demand. The method is comprehensively designed and applied[2].

On the other hand, network topology control. The network system corresponding to wireless sensors also has a large number of nodes with dense distribution. Whether it is reducing, increasing or changing nodes, the network topology will change. This requires the attention of technicians. Controlling the automatic generation of the network topology can lay a good foundation for the development of node positioning, data communication and convergence. At this stage, the focus of network topology control is to choose the backbone network node and power control, and will not The necessary wireless communication link is eliminated between nodes to generate a topology

capable of efficiently forwarding data, for example, topology control with clustering and local optimization as the core. However, the models proposed by the existing methods are too idealistic. Direct application in wsn, the obtained effect is difficult to be guaranteed, only according to the characteristics of the Internet of Vehicles, the development of the corresponding topology control mechanism, improve the reliability of the network, in order to achieve the rapid formation of the topology, save energy.

2.1.3. node communication technology

Wsn node communication includes four aspects, namely, in-vehicle communication, vehicle-vehicle communication, vehicle-to-road communication and off-road communication. Among them, the technology that the in-vehicle communication needs to be applied, including Bluetooth and ultra-wideband; the vehicle-to-vehicle communication needs to be applied. Technology, including microwave, dsrc and infrared; technologies that need to be applied to road communication, including microwave, wifi and infrared; technologies that need to be applied to off-road communication, including 2g, 3g and gps. Existing communication technologies are available. Advantages and deficiencies, different application environments, different communication modes and technologies are applicable. It is imperative to effectively integrate the above technologies in the Internet of Vehicles, so that their positive effects can be fully exerted, only in the above work. After that, the communication standards and systems are formulated to ensure the validity of the standards and systems.

2.2. Cloud Computing Technology

To fully utilize the premise of the role of the Internet of Vehicles, it is a powerful support platform for analyzing and processing traffic data. It can be seen that it is necessary to combine the Internet of Vehicles and cloud computing. Only in this way can the transportation be facilitated by complementary advantages. Sexual guarantee.

2.2.1. Processing of traffic data

The way in which cloud computing stores data is distributed storage, and the application can improve the redundant storage of the reliability of the stored data. In addition, the mode of cloud computing management data is generally stored in columns, specifically, it is based on columns. The traffic data table is divided and stored. The traffic data processing work has high requirements on real-time performance. In addition, there are also characteristics of serious data fluctuation, large amount of information and high sharing, which raises the requirements for processing, storing and managing data. Necessary. The advantage of cloud computing lies in its excellent performance in terms of computing power, which can complete the analysis and processing of large amounts of data in a short period of time. Although powerful computing power, more and more people use cloud computing as an analysis. The preferred technology for handling traffic data, but technicians who don’t know enough about cloud computing often cannot fully utilize related resources, which highlights the importance of establishing a cloud computing platform. The research will focus on traffic data modeling, distributed processing and forecasting traffic flow[3].

2.2.2. Guarantee traffic data security

Safety is of great significance to traffic data. If it is a practice, the safety of traffic data is found to be problematic, and the consequences are often difficult to predict. Although the application of cloud computing technology can effectively improve the efficiency of data processing, it also brings certain risks. This is because cloud computing covers more data resources and is more concentrated than traditional applications. The risk is naturally not mentioned. And Yu. For transportation, the content referred to by information security mainly includes platform availability, data storage

security, etc., and can fundamentally solve the security problems faced by traffic data by transforming the traffic cloud into a hybrid cloud. In addition, the solution that can be referenced by the technicians includes setting up the service platform into a public cloud, providing the required services to the public, building the data center into a private cloud, and relying on the virtual architecture to complete the viewing, monitoring, and remote control. The work of virtual resources, between the public cloud and the private cloud, sets a firewall to cut off the connection between the data center and the outside world.

2.2.3. Application of traffic data

According to the application mode, the service mode of cloud computing can be divided into "software as a service", "platform as a service" and "facilities as a service". These three modes together constitute the spi model, in which software as a service corresponds to s, Platform-as-a-service correspondence, facility-as-a-service correspondence i. Existing services are generally in the initial stage of development, for example, travel-inducing services, geographic information services, etc., technical personnel should focus on how to establish a cloud service system to ensure the establishment of a system The role can be fully utilized in the practice process.

Conclusion

It can be seen from the above analysis that the scientific and efficient vehicle networking system should first use wsn to obtain data such as vehicle location and traffic demand, and then use cloud computing to complete the analysis of the acquired data. In order to achieve the goal of organizational guidance, urban traffic conditions can also be fundamentally improved, and the importance of cloud computing and wsn technology is self-evident.

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